

WHAT IS CLAIMED IS:

1. A method of writing rewrite data over existing data in a memory, the memory having a sector partitioned into a plurality of areas, the existing data being written at a same position in the respective areas, the method comprising:

taking an exclusive-OR of the rewrite data and existing data at a target position in a first area;

taking an exclusive-OR of the exclusive-OR data, which is obtained by the previous exclusive-OR process, and existing data at the target position in a second area; and

performing a similar exclusive-OR process up to a final area, wherein in the course of repeating these exclusive OR processes, when the data at the target position in the area concerned are an initial value, then the most recent exclusive-OR data are written to the target position in the area concerned.

2. The method of writing rewrite data according to claim 1, wherein if there is no initial value when the exclusive-OR process is carried out up to the final area, then for a same position in each of the areas, an exclusive-OR of data in the first area and data in the second area is taken, an exclusive-OR of the resulting exclusive-OR data and data in a third area is taken, and a similar exclusive-OR process is performed up to the final area so that all data within the sector are read and the data at the target positions are changed to the rewrite data, and then, all the data within the sector are erased and all new data, including the rewrite data, are written to the first area in the sector.

3. A method of writing rewrite data over existing data in a memory, the memory having a sector partitioned into a plurality of areas to which the existing data have been written, the method comprising:

5       taking an exclusive-OR of the rewrite data and existing data in a first area of the sector;

          taking an exclusive-OR of the exclusive-OR data, which is obtained by the previous exclusive-OR process, and existing data in a second area; and

10       performing a similar exclusive-OR processes up to a final area, wherein in the course of repeating these exclusive-OR processes, when the data in the area concerned are an initial value, the most recent exclusive-OR data is written to the area concerned.

15       4. The method of writing rewrite data according to claim 3, wherein if there is no initial value when the exclusive-OR process is carried out up to the final area, all the areas within the sector are erased and the rewrite data are written to the first area of the sector.

20       5. A method of writing rewrite data over existing data in a memory, the memory having a sector and a pointer sector, the sector being partitioned into a plurality of areas, the existing data being written to the plurality of areas, a plurality of pointer data being written to the pointer sector  
25       such that the pointer data designate area numbers of the areas of the sector respectively, the method comprising:

          taking an exclusive-OR of first pointer data and second

pointer data in the pointer sector;

taking an exclusive-OR of the exclusive-OR pointer data, which is obtained by the previous exclusive-OR process, and third pointer data; and

5 performing a similar exclusive-OR processes up to final pointer data to read an ultimate area number, wherein the existing data are read from the area of the sector based on the ultimate area number, an exclusive-OR of this existing data and the rewrite data is taken to prepare new rewrite data, and then,  
10 when the area number is smaller than a number of the areas of the sector, the area number is incremented by 1 and the new rewrite data is written to the area of the incremented area number, and when the area number is equal to the number of the areas, all data within the sector are erased, the new rewrite data is  
15 written to the first area of the sector and the area number is set to 1.

6. The method of writing rewrite data according to claim 5, wherein when writing the area number that has been incremented by 1 or an area number of 1 to the pointer sector, an exclusive-OR  
20 of that area number and the first pointer data of the pointer sector is taken, an exclusive-OR of that exclusive-OR pointer data and the second pointer data is taken, a similar exclusive OR process is performed successively up to the final pointer data, and in the course of repeating these exclusive OR processes,  
25 when the pointer data are an initial value, the most recent exclusive-OR pointer data are written over the pointer data, and when there is no initial value when the exclusive OR process

is carried out up to the final pointer data, all pointer data within the pointer sector are erased and then the area number is written to the first area of the pointer sector.

7. A method of rewriting data in a memory, the memory  
5 having two sectors and a selector sector, each of the two sectors partitioned into a plurality of areas such that the data are written at identical positions in the respective areas, a plurality of selector data for selecting one of the two sectors being written to the selector sector, the method comprising:  
10 taking an exclusive-OR of first selector data and second selector data in the selector sector;  
taking an exclusive-OR of the exclusive-OR selector data, which is obtained by the previous exclusive-OR process, and third selector data;  
15 performing a similar exclusive-OR process up to final selector data to read sector selection data, wherein an exclusive-OR of data at a target position in a first area of one of the two sectors designated by the sector selection data and rewrite data is taken, an exclusive-OR of the resulting  
20 exclusive-OR data and data at the target position in a second area of the same sector is taken, a similar exclusive-OR process is performed up to a final area, and in the course of performing these exclusive-OR processes, when data at the target position in an area is an initial value, then the most recent exclusive-OR  
25 data is written to the target position of that area.

8. The method of rewriting data in a memory according to claim 7, wherein when there is no initial value when the exclusive

OR process has been carried out up to the final area, then, for each same position in the areas, an exclusive-OR of a data in the first area and data in the second area is taken, an exclusive-OR of that exclusive-OR data and data in the third area is taken, a similar exclusive-OR process is performed up to the final rear so as to read all data from the sector, the data at the target position are changed to the rewrite data, all new data, including the rewrite data, are written to the first area of the other sector and the sector selection data is incremented by 1.

9. The method of rewriting data in a memory according to claim 8, wherein when the sector selection data is incremented by 1, an exclusive-OR of the incremented sector selection data and the first selector data of the selector sector is taken, an exclusive-OR of that exclusive-OR selector data and the second selector data is taken, a similar exclusive-OR process is performed up to the final selector data, and in the course of performing these exclusive-OR processes, when the selector data is an initial value, the most recent exclusive-OR selector data is written over that selector data, and when there is no initial value when the exclusive OR process has been carried out up to the final selector data, all selector data within the selector sector are erased and then the sector selection data are written to the first area of the selector sector.

10. A method of rewriting data in two memories, each of the two memories having a sector, the sector having a plurality of areas to which data are written and a control area to which

memory selection data and area designation data are written,  
the method comprising:

A) selecting one of the two memories based on memory  
selection data in the control areas of the two memories;

5 B) writing rewrite data to an area determined by the area  
designation data in the control area of the selected memory;

C) erasing data in the areas of the other memory in a  
piecemeal manner;

D) repeating the steps B and C until the rewrite data are  
10 written to all the areas of the selected memory, such that erasing  
of the data within all the areas of the other memory is completed  
when the rewrite data are written to all the areas of the selected  
memory; and

E) switching the roles of the two memories and repeating  
15 the steps B, C and D so that the rewrite data are written to  
the two memories in alternation.

11. The method of rewriting data in two memories  
according to claim 10, wherein a cache memory is provided in  
addition to the two memories, so that when the rewrite data is  
20 written to one of the two memories, the same rewrite data are  
also written to the cache memory, and wherein when the rewritten  
data should be read from that memory, the rewrite data are read  
from the cache memory, not from that memory.

12. A method of writing rewrite data over existing data  
25 in a memory, the memory having a sector and a pointer sector,  
the sector being partitioned into a plurality of areas, the  
existing data being written to the plurality of areas, a

plurality of pointer data being written to the pointer sector such that the pointer data designate area numbers of the areas of the sector respectively, the method comprising:

5 taking an exclusive-OR of first pointer data and second pointer data in the pointer sector;

taking an exclusive-OR of the exclusive-OR pointer data, which is obtained by the previous exclusive-OR process, and third pointer data; and

10 performing a similar exclusive-OR processes up to final pointer data to read an ultimate area number, wherein when the ultimate area number is smaller than a number of the areas of the sector, the ultimate area number is incremented by 1 and the rewrite data is written to the area of the incremented area number, and when the ultimate area number is equal to the number  
15 of the areas, all data within the sector are erased, the rewrite data is written to the first area of the sector and the ultimate area number is set to 1.